

Attorney Docket No. IL-11267

REMARKS35 USC 112, first paragraph

Claims 1-5 and 12-20 have been rejected under 35 USC 112, first paragraph. Claims 1 and 15 have been amended in a manner believed to obviate the rejection. Withdrawal of the rejection is respectfully requested.

35 USC 112, second paragraph

Claims 1-5 and 12-20 have been rejected under 35 USC 112, second paragraph. Claims 1 and 15 have been amended in a manner believed to obviate the rejection. Withdrawal of the rejection is respectfully requested.

Claim 14 has been rejected under 35 USC 112, second paragraph. Claim 14 has been amended in a manner believed to obviate the rejection. Support for the amendment is found in paragraph [0008]. Withdrawal of the rejection is respectfully requested.

Claim 20 has been rejected under 35 USC 112, second paragraph. Claim 20 has been amended in a manner believed to obviate the rejection. Withdrawal of the rejection is respectfully requested.

Claims 1, 3, 5, 14, 15, 20

Claims 1, 3, 5, 14, 15 and 20 have been rejected under 35 USC 102(b) as being anticipated by Petricevic et al. ("Planar fibre reinforced carbon aerogels and application in PEM fuel cells").

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Moreover, the identical invention must be shown in as complete detail as contained in the claim. *Richardson v. Suzuki Motor Co.* 868 F.2d 1226, 1236, 9USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements

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must be arranged as required by the claim. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Applicants respectfully assert that the rejection of claim 1 is improper. Regarding claim 1, the rejection points to Petricevic's disclosure of a sodium carbonate catalyst as a transition metal oxide catalyst. However, as the Examiner correctly pointed out in the rejection of claim 14 under 35 USC 112, second paragraph, sodium carbonate is not a transition metal oxide. Therefore, the rejection of claim 1 is improper.

Applicants also note that the Examiner has construed the definition of a "transition metal oxide catalyst" as being one of the species of claim 14. However, under the doctrine of claim differentiation, it is assumed that two claims in the same patent will not have the identical scope. Therefore, interpreting a limitation of the parent claim to include only those species listed in a dependent claim is error. Regardless, claim 14 has been amended, and so this interpretation, even if proper, would no longer be valid.

Claim 1 has also been amended to require that the chars are fuel capable of being combusted in a molten salt electrochemical fuel cell in the range from 500 C to 800 C. In sharp contrast, neither the method of preparation of Applicant's monolith nor Applicant's final product is disclosed or suggested by the Petricevic reference. The Petricevic reference does not disclose or suggest preparing a fuel. Applicant submits that the method of preparation of Applicant's monolith and fuel as well as the finished product is not disclosed or suggested in Petricevic. The anticipation rejection should be withdrawn.

Claims 3, 5 and 14 depend from claim 1, and therefore incorporate the limitations of claim 1. By virtue of their dependence, claims 3, 5 and 14 are also believed to be allowable.

Further, regarding claim 14, as amended, Petricevic fails to disclose performing pyrolysis in the presence of any of the listed materials. *See* Petricevic 2. Experimental, indicating that the pyrolysis is performed in the presence of Ar gas.

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Claim 15 has been amended to require that said composite is suitable for use as an anode with the chars being fuel capable of being combusted in a molten salt electrochemical fuel cell in the range from 500 C to 800 C to produce electrical energy. In sharp contrast, nowhere does Petricevic teach or suggest that the disclosed structures are suitable for use as an anode with the chars being fuel capable of being combusted in a molten salt electrochemical fuel cell in the range from 500 C to 800 C to produce electrical energy.

Further, neither the method of preparation of Applicant's monolith nor Applicant's final product is disclosed or suggested by the Petricevic reference. The Petricevic reference does not disclose or suggest preparing an anode with fuel. Applicant submits that the method of preparation of Applicant's monolith and fuel as well as the finished product is not disclosed or suggested in Petricevic. The anticipation rejection should be withdrawn.

Additionally, the rejection of claim 15 relies on inherency, and particularly that the pyrolyzing step of Petricevic will produce wettable carbon chars meeting the claimed limitations. However, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). Rather, to establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted). In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original).

Returning to the rejection, no evidence has been provided the procedures disclosed in Petricevic would produce wettable chars that are fuel capable of being combusted in a molten salt electrochemical fuel cell in the range from 500 C to 800 C to produce electrical energy. In fact,

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the only support in the rejection is to section 3.2 of Petricevic, which indicates that the wettability of the RF sol depends on the hydrophilic character of the fleece. However, this appears to refer to a step prior to pyrolyzation. Particularly, a sol is generally defined as a fluid colloidal system (solids suspended in a liquid); especially: one in which the continuous phase is a liquid. A full reading of Section 3.2 appears to support this reading. For instance, adding the immediately following sentence to the sentence cited in the rejection, we have:

The wettability with the RF sol depends on the hydrophilic character of the fleece. Cellulose is very hydrophilic and thus shows good wettability which simplifies the handling during preparation. (emphasis added)

Thus, the section of Petricevic relied on to anticipate claim 15 in actuality refers to a different processing step.

As noted in Applicants' prior response, not only is Applicants' method of preparation different, but the final product is also different. It is the method of preparation that defines the properties of the final product. Accordingly, because the final products are different, the method to produce them must also be different. It follows that Petricevic cannot then inherently disclose the claimed product by process because the two different products inherently must be created using different steps and compositions.

As evidence that Petricevic fails to inherently contain pyrolyzing said composite gel to form a wettable aerogel/carbon composite or a wettable xerogel/carbon composite, reference is made to Petricevic Section 1, second paragraph, where he states that "The oxygen electrode should be hydrophobic in order to allow for a sufficiently fast release of water."

The Petricevic product and the monolith of claim 15 are intended for use in two very different applications. Petricevic designed his material to be used as gas diffusion electrodes in batteries and especially in PEM fuel cells. The monolith of claim 15, on the other hand is meant to be suitable as an anode as well as a source of fuel for Direct Carbon Fuel Cells (DCFC). Clearly, these are very different applications. Further, the vast difference in their uses gives rise to significant differences in these products as well.

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The most obvious difference between the two products is hydrophobicity. Specifically, in order to properly function as a gas diffusion electrode the Petricevic material must be hydrophobic. The monolith of claim 15 allows the DCFC electrolyte to be in intimate contact with the anode so that the anode material can be consumed as a fuel. Thus making the monolith of claim 15 hydrophobic will work against its intended use. So what is good for Petricevic (i.e., hydrophobicity) is bad for the monolith of claim 15.

It should be noted that this difference in properties is not a trivial matter. For while most of the starting materials used to make both products are quite similar the processes and compounds needed to make Petricevic hydrophobic are entirely different from anything found in claim 15.

Further, U.S. Patent No. 6,503,655 to Petricevic et al. (hereinafter, the '655 Patent, already of record) describes in detail the complexity of the process required to impart this critical property (hydrophobicity). This is clearly described in Examples 1 & 2 of the '655 Patent which indicate that it is necessary to impregnate the product with compounds such as trimethylchlorosilane (Example 1) or a copolymer of 2, 2-dimethyldioxole and tetrafluoroethylene in perfluorodecane (Example 2) in order to impart the desired degree of hydrophobicity. Furthermore, the Patent makes clear that these procedures are necessary to give the material its required hydrophobic property. Nothing like this is required by claim 15.

To further stress the critical nature of all this, Petricevic explicitly mentions in Claim 1 (the independent claim) of the '655 Patent that the "composite" material has to be hydrophobicized. Its importance is further underlined by Claims 18, 19, 20 & 21 of the '655 Patent.

Given this difference between Petricevic and claim 15 we believe there is no reason for claim 15 to be rejected.

Therefore, absent some showing of how Petricevic inherently contains the missing claim limitations, the rejection must be withdrawn.

For any of the foregoing reasons, reconsideration and allowance of claim 15 is respectfully requested.

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Claim 20 depends from claim 15, and therefore incorporate the limitations of claim 15. By virtue of its dependence, claim 20 is also believed to be allowable.

Additionally, regarding claim 20, Applicants respectfully assert that the rejection is erroneous for failing to provide evidence that Petricevic's aerogel inherently has a porosity that prevents percolation through its interior. Rather, Petricevic is replete with discussion of the high degree of porosity his structures contain.

Further, claim 20 is directed to a xerogel/carbon composite, not an aerogel. Accordingly, Petricevic has been misapplied.

Claims 2, 12, 16-18

Claims 2, 12 and 16-18 have been rejected under 35 USC 103(a) as being unpatentable over Petricevic in view of Erkey et al. (US20040029982).

The rejection of claim 2 applies Petricevic as for claim 1. Claim 2 depends from claim 1, and therefore the rejection suffers from the same deficiencies as set forth above with respect to claim 1. Because Erkey has merely been added to allegedly show the limitation of the dependent claim, claim 2 is believed to be allowable over the combination proposed by the Examiner. Reconsideration and allowance of claim 2 is respectfully requested.

The rejection of claim 12 applies Petricevic as for claim 1. Claim 12 depends from claim 1, and therefore the rejection suffers from the same deficiencies as set forth above with respect to claim 1. Because Erkey has merely been added to allegedly show the limitation of the dependent claim, claim 12 is believed to be allowable over the combination proposed by the Examiner. Reconsideration and allowance of claim 12 is respectfully requested.

The rejection of claim 16 applies Petricevic as for claim 15. Claim 16 depends from claim 15, and therefore the rejection suffers from the same deficiencies as set forth above with respect to claim 15. Because Erkey has merely been added to allegedly show the limitation of the

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dependent claim, claim 16 is believed to be allowable over the combination proposed by the Examiner. Reconsideration and allowance of claim 16 is respectfully requested.

The rejection of claim 17 applies Petricevic as for claim 15. Claim 16 depends from claim 15, and therefore the rejection suffers from the same deficiencies as set forth above with respect to claim 15. Because Erkey has merely been added to allegedly show the limitation of the dependent claim, claim 17 is believed to be allowable over the combination proposed by the Examiner. Reconsideration and allowance of claim 16 is respectfully requested.

The rejection of claim 18 applies Petricevic as for claim 15. Claim 18 depends from claim 15, and therefore the rejection suffers from the same deficiencies as set forth above with respect to claim 15. Because Erkey has merely been added to allegedly show the limitation of the dependent claim, claim 18 is believed to be allowable over the combination proposed by the Examiner. Reconsideration and allowance of claim 18 is respectfully requested.

Claim 4

Claim 4 has been rejected under 35 USC 103(a) as being unpatentable over Petricevic in view of Stepanian et al. (US20020094426).

The rejection of claim 4 applies Petricevic as for claim 1. Claim 4 depends from claim 1, and therefore the rejection suffers from the same deficiencies as set forth above with respect to claim 1. Because Erkey has merely been added to allegedly show the limitation of the dependent claim, claim 4 is believed to be allowable over the combination proposed by the Examiner. Reconsideration and allowance of claim 4 is respectfully requested.

Claims 13, 19

Claims 13 and 19 have been rejected under 35 USC 103(a) as being unpatentable over Petricevic in view of Rhine et al. (US20040132845).

The rejection of claim 13 applies Petricevic as for claim 1. Claim 13 depends from claim

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1, and therefore the rejection suffers from the same deficiencies as set forth above with respect to claim 1. Because Erkey has merely been added to allegedly show the limitation of the dependent claim, claim 13 is believed to be allowable over the combination proposed by the Examiner. Reconsideration and allowance of claim 13 is respectfully requested.

The rejection of claim 19 applies Petricevic as for claim 15. Claim 19 depends from claim 15, and therefore the rejection suffers from the same deficiencies as set forth above with respect to claim 15. Because Erkey has merely been added to allegedly show the limitation of the dependent claim, claim 19 is believed to be allowable over the combination proposed by the Examiner. Reconsideration and allowance of claim 19 is respectfully requested.

New Claims

New claims 21-24 have been added to further define and vary the scope of the present invention. The claims are fully supported in the present application and drawings as originally filed. No new matter has been added.

These claims are directed to a reinforced xerogel/carbon composite produced by a process comprising the enumerated steps. In sharp contrast, the art of record are all directed to formation of aerogels. Accordingly, the art of record fails to disclose the novel combination of features claimed in claims 21-24.

Allowance of claims 21-24 is respectfully requested.

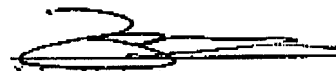
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Conclusion

In the event that the Examiner finds any remaining impediment to the prompt allowance of these claims that could be clarified with a telephone conference, he or she is respectfully requested to initiate the same with the undersigned at (925) 422-7073.

Respectfully submitted,

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